D E C L A R A T I O N

I, Ryuichi YAMADA, a Japanese Patent Attorney registered No. 7898 having my Business Office at Hasegawa Bldg., 4F, 7-7 Toranomon 3-chome, Minato-ku, Tokyo, Japan, solemnly and sincerely declare:

That I have a thorough knowledge of Japanese and English languages; and

That the attached pages contain a correct translation into English of the specification of the following Japanese Application:

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Applicant(s)

CANON KABUSHIKI KAISHA

Signed this 8th day of August, 2005.

Ryuichi YAMADA

PATENT OFFICE

JAPANESE GOVERNMENT

This is to certify that the annexed is a true copy of the following application as filed with this Office.

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Applicant(s)

CANON KABUSHIKI KAISHA

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Specification

[Title of the Invention]

Ink Container

[Claims]

1. An ink container for ink jet detachably mountable relative to a holder provided with a recording head portion for ejecting an ink droplet, which accommodates an ink used for effecting recording, for supplying the ink to the recording head portion, said ink container comprising:

a plurality of supply ports disposed on a bottom portion of said ink container in used of said ink container, for supplying said ink to said recording head portion, respectively;

a first engaging portion provided on a part of one of side surfaces of said ink container, for bringing into engagement with a first locking portion formed in said holder;

a second engaging portion provided on other wide surface which is facing to one of the side surfaces where said first engaging portion is disposed, for bringing into engagement with a second locking portion formed in said holder; and

wherein said ink supply port, said first engaging portion and said second engaging portion are

linearly arranged deviated in a direction substantially perpendicular to the direction of a line connecting said first engaging portion and said second engaging portion toward at least one side surface of the two side surfaces sandwiching the bottom portion of said ink container, and wherein said plurality of supply ports are all arranged substantially on a line connecting said first engaging portion and said second engaging portion.

[Detailed Description of the Invention]

[Field]

The present invention relates to an ink container to be carried on an ink jet recording apparatus for effecting recording on a recording material by ejecting an ink, more particularly to an ink container detachably holding relative to the ink jet recording head of cartridge type.

[Related Art]

A known ink jet recording apparatus comprises an ink container for accommodating ink, an ink jet recording head (hereinafter, referred to recording head cartridge) which receives ink from an ink container and which ejects ink droplets, a carriage for detachably carrying the ink jet recording head, feeding means for feeding a recording material such as paper, film or the like, and control means for

controlling them.

In such an ink jet recording apparatus, the positioning between the ink container and the holder portion of a recording head cartridge mounting the ink container is an important aspect concerning the image quality of the ink.

Hereinafter, the positioning structure between an ink container and a holder portion will be described with reference to Figure 8, which discloses in Patent No. 2801149 as a structural example. Figure 8(a) is a perspective view illustrating a state in which an ink container is going to be mounted into a holder portion; and Figure 8(b) is a perspective view illustrating a state in which an ink container is mounted relative to a holder portion.

A recording head cartridge 1 comprises a recording head portion 103 for ejecting ink droplet to a holder 102 detachably mountable an ink container 101. The ink container is provided with a plurality of the supply ports (unshown) and an air vent 101a. The supply ports (unshown) for supplying ink relative to the recording head portion 103 are disposed at a bottom portion of the ink container 101, respectively, and an air vent 101a for in fluid communication between the inner wall of the ink container and an ambience is disposed at a ceiling surface (top portion) of the ink container 101. A first engaging

portion 101b in the form of a projection for bringing into engagement with the holder 102 is disposed at one side surface of the ink container 101, and a second engaging portion 101c in the form of a latch lever for elastically deforming and bringing into engagement with the holder 102 is disposed at the other side surface which is facing to the one side surface of the ink container 101. The supply ports (unshown) of the ink container 101 are disposed between the first engaging portion 101b and the second engaging portion 101c, respectively.

On the other hand, the holder 102 comprises a first locking portion (unshown) for bringing into engagement with the first engaging portion 101b, and a second locking portion (unshown) for bringing into engagement with the second engaging portion 101c of the ink container 101. And, the holder 102 comprises an ink receiving tube 104 abutted to the ink supply port of the ink container 101 disposed between the first locking portion and second locking portion, for receiving the ink to the recording head portion 103.

The first engaging portion 101b and second engaging portion 101c disposed at respective positions such as to interpose the plurality of ink supply ports therebetween, of the ink container 101 are brought into engagement with the engaging holes which are first locking portion and the second locking portion

of the holder 102 corresponding to the first engaging portion 101b and the second engaging portion 101c, respectively. With the above-mentioned structure, respective positions which are facing to each other, of the ink container 101 are held to the holder 102, respectively, the positioning of the ink container 101 relative to the holder 102 are assured. Therefore, the ink supply port (unshown) of the ink container 101 can be assuredly connected to the ink receiving tube 104 as a means for supplying the ink from the ink supply port (unshown) to the holder 104. As a result, the ink is prevented from leakage from the ink container.

[Patent Reference]

Patent No. 2801149

[Problems to be Solved]

Recently, in the ink jet printer by which the apparatus has been downsized, the ink container requires that the maximum amount of the inks are retained within the ink container with a small volume occupied by the ink container, and large inside volume of the ink container relative to the space occupied by the ink container has to be assured. For the above-mentioned purpose, the ink container requires that the wall thickness of the ink container casing is reduced. In this case, the mechanical strength of the ink container casing is likely to be weak. Particularly,

the strength at the portion of the container bottom wall where the large openings such as ink supply ports are formed is likely to be relatively weak, and therefore, the stabilized mounting is not likely to be accomplished with the ink supply ports securely connected respectively by twisting of the ink container upon the mounting of the ink container to the holder portion. Further, in the mounting structure of the ink container to the holder portion wherein around the ink supply port is sealed by a rubber member or the like in order to suppress the ink evaporation, small thickness of the portion of the container bottom portion where the ink supply ports are formed is likely to be elastically deformed by bending force of the rubber member. In the worst case, the inks are likely to be leaked from the ink container.

Particularly, in the ink container for retaining a plurality of inks for color printing, the above-mentioned problems are further increased since the ink container is provided with a plurality of ink supply ports.

In addition, in the ink container provided with the plurality of ink supply ports, the ink supply ports have to be securely connected to the ink receiving portions of the holder, respectively, and therefore, the stabilized ink supply has to be

accomplished. However, in order to assuredly mount all of a plurality of ink supply ports the holder portion with a good balance, it is required that the size of engaging portion between the ink supply ports and holder portion is increased and a plurality of engaging portions are provided. As a result, the size of the ink container is increased. In the structure that the projected portion of the ink container is brought into engagement with the opening of the holder portion, the size of the opening of the holder portion is increased, and the plurality of the openings are provided in the ink container, this results the mechanical strength reduction of holder portion, and therefore, the stabilized positioning of the ink container to the holder portion is not likely to be accomplished.

By the provision of the ink supply port abutted to the ink receiving portion of the holder portion on the bottom portion of the ink container, in the structure that the first engaging portion and the second engaging portion provided on side walls connecting with the container bottom wall, which are facing to each other, are brought into engagement with the first locking portion and the second locking portion corresponding to the first engaging portion and the second engaging portion, respectively, as shown in Figure 8, in the case that the first engaging

portion and the second engaging portion are deviated the position which is facing to the first engaging portion and the second engaging portion, the stabilized mounting can be accomplished with all the ink supply ports assuredly connected respectively without warping of the ink container casing even when the entire ink container casing is supplied with the twisting force during the mounting of the ink container to the holder portion, since the wall thickness of the conventional ink container casing is relatively thicker. However, when the wall thickness of the entire ink container casing is reduced in order to assure the large inside volume of the ink accommodating portion, the rigid of the entire ink container casing against to the bending force when the ink supply ports are abutted to the ink receiving portion of the holder portion, and the twisting force during the mounting of the ink container to the holder portion, is reduced. Therefore, the mounting with all the ink supply ports assuredly connected respectively, is not stabilized. As a result, it becomes difficult to accomplish the stabilized mounting with the ink supply ports assuredly connected respectively whenever the number of ink supply ports is large.

In view of the above-mentioned related background art, it is a principal object of the present invention to provide an ink container wherein

the mechanical strength reduction between a holder portion and an ink container is suppressed when the ink container is downsized, an ink jet recording head having the holder portion exhibiting a stabilized mounting of the ink container and a reliability, and an ink jet recording apparatus provided with the ink jet recording head.

[Means for Solving]

In accordance with a principal aspect of the present invention for accomplishing the above-mentioned object, there is provided an ink container for ink jet detachably mountable relative to a holder provided with a recording head portion for ejecting an ink droplet, which accommodates an ink used for effecting recording, for supplying the ink to the recording head portion, the ink container comprising: a plurality of supply ports disposed on a bottom portion of the ink container in use of the ink container, for supplying the ink to the recording head portion, respectively; a first engaging portion provided on a part of one of side surfaces of the ink container, for bringing into engagement with a first locking portion formed in the holder; a second engaging portion provided on other wide surface which is facing to one of the side surfaces where the first engaging portion is disposed, for bringing into engagement with a second locking portion formed in the

holder; and wherein the ink supply port, the first engaging portion and the second engaging portion are linearly arranged deviated in a direction substantially perpendicular to the direction of a line connecting the first engaging portion and the second engaging portion toward at least one side surface of the two side surfaces sandwiching the bottom portion of the ink container, and wherein the plurality of supply ports are all arranged substantially on a line connecting the first engaging portion and the second engaging portion.

In the above-mentioned ink container according to the present invention, by positioning the ink supply ports disposed on the bottom portion of the ink container adjacent the corner portion (side wall connecting with the bottom portion of the ink container) where the rigid of the casing is relatively high, the mechanical strength reduction of the ink container casing can be suppressed. This is effective to prevent deformation of the ink container upon the container mounting relative to the holder and upon the connecting of the liquid supply portions between the holder and the ink container. The two engaging portions are deviated toward the side surface of the ink container when the ink container is mounted to the holder, similar to the ink supply ports, therefore, the ink container is prevented from twisting upon the

mounting of the ink container to the holder, so that the ink container can be stably secured with the holder by a small number of engaging portions. Particularly, even when the number of the ink supply ports is large, the twisting of the ink container can be minimized effectively by the linear arrangement of the engaging portions and the ink supply ports. By the provision of the engaging portion at the position close to the side surface of the ink container, the ink container positioning mechanism of the ink container can be disposed at a position where the container strength is high, so that stabilized mounting can be accomplished with all the ink supply ports securely connected respectively. These advantages are particularly significant when the wall thickness of the entire ink container casing is reduced in order to assure a large inside volume of the ink container.

In such an ink container, a plurality of ink supply ports can be abutted to the ink receiving portions of the holder portion, respectively, and the number of the locking portions required for the holder can be reduced since the stabilized mounting of the ink container can be accomplished by only two engaging portions. Particularly, when the engaging portion of the ink container is in the form of a projection, and the locking portion of the holder portion is in the

form of an opening, the wall inside area of the holder portion is reduced. Therefore, the mechanical strength reduction of the holder portion can be prevented, and stabilized mounting of the ink container to the holder can be accomplished.

[Detailed Description of the Preferred Embodiments]

Referring to the accompanying drawings, the preferred embodiments will be described.

Figure 1 is a perspective view of an outer appearance of an ink container and a holder portion which constitute color recording head cartridge according to an embodiment of the present invention. Figure 2 is a top plan view of a holder shown in Figure 1. Figure 3 illustrates a structure of an ink container shown in Figure 1, wherein (a) is a top plan view thereof, (b) is a partly broken side view thereof, and (c) is a bottom view thereof. Figure 4 is a perspective view of a color ink container shown in Figure 1. Figure 5 is a perspective view illustrating a state in which a black ink container and a color ink container are going to be mounted into a holder shown in Figure 1. Figure 6 is a perspective view illustrating a state in which a black ink container and a color ink container are going to be mounted into a holder shown in Figure 1.

As shown in Figure 1, the recording head cartridge 30 for color recording comprises a holder 31

which has an integral recording head portion 32 (ink jet type) for ejecting ink droplets, an ink container 10A detachably held by the holder 31, and an ink container 10B. The ink container 10A contains black ink to be supply to the recording head portion 32. The ink container 10B contains yellow, magenta and cyan inks to be supplied to the recording head portion 32, respectively.

The head portion 32 is disposed at a bottom portion of the holder 31 in use, and comprises a group of ejection outlet (unshown) corresponding to the black ink to be supplied from the ink container 10A, a group of ejection outlets (unshown) for the yellow ink to be supplied from the ink container 10B, a group of ejection outlets (unshown) for the magenta ink, and a group of ejection outlets (unshown) for the cyan ink. At the connecting portion of the holder 31 between the ink containers 10A, 10B, there are provided projected ink receiving tubes 33 corresponding to the respective color inks accommodated in the ink containers 10A, 10B, and the ink receiving tubes 33 are in fluid communication with the respective groups of the ejection outlets through the respective ink supply passages (unshown). In order to define the regions for receiving the respective ink containers 10A, 10B, the bottom wall of the holder 31 is provided with integral partition plates 38.

The holder 31 is provided with one ink receiving tube 33 corresponding to the position of the ink supply port 14 of the ink container 10A for the black color and is provided with three ink receiving tubes 33 corresponding to the position of the ink supply ports 14 of the color ink containers 10B. Around each of the ink receiving tubes 33, a sealing member 39 is mounted to prevent ink evaporation and ink leakage, into the holder 31, of the ink supplied from the ink containers 10A, 10B through the ink receiving tube 33.

On the other hand, the ink container 10B comprises a casing 11 which constitutes an ink accommodating portion for accommodating the ink and which has an open top end, and a cap member 12 which closes the open top end of the casing 11 and which is provided with a rib structure 13 for providing a buffering space (Figure 3, (b)).

The bottom portion of the casing 11 is provided with ink supply ports 14 at positions corresponding to the ink receiving tubes 33, for the respective colors, of the holder 31 when the ink container 10B is mounted to the holder 31.

Within the casing 11, there are provided a first ink retaining member 50 and a second ink retaining member 51 for being impregnated with the respective inks to retain them. The first ink

retaining member 50 is closely contacted to the second ink retaining member 51 between the second ink retaining member 51 and the ink container bottom wall and closes the ink supply port 14.

The basic structure of the ink container applies also to the ink container 10A for the black color.

However, in the case of the ink container 10B for the color inks, the inside of the casing 11 has to accommodate three color inks, and therefore, two parallel partition plates 52 divide the inner space into three substantially equal ink containing spaces. These three spaces are arranged substantially on a line connecting a retention claw 17 and a latch claw 18 which are engaging portions when the color ink container 10B is mounted to the holder 31.

The yellow, magenta and cyan ink supply ports 14b corresponding to the respective containing spaces in the casing 11 are opened at the bottom portion of the casing 11.

Around the ink supply port 14, there is provided a dimple portion 40 which is formed by reducing the thickness of the bottom wall of the casing 11. The bottom surface of the dimple portion 40 functions as a seal surface to which a sealing member 39 provided around the ink receiving tube 33 of the holder 31 is sealingly contacted. A standing wall

of the dimple portion 40 is cut away at least at one side Q of the ink container 10B and is opened (cut-away portion indicated by reference numeral 40a in Figure 4).

Each of the ink containing spaces of the has a first ink retaining member 50 for absorbing and retaining the yellow, magenta, cyan ink, and has a second ink retaining member 51 for supplying the ink out.

The first ink retaining member 50 and the second ink retaining member 51 both function to be impregnated with and to retain the ink, but is different in the ink retaining force, more particularly, the ink retaining force of the first ink retaining member 50 (capillary force) is higher than the ink retaining force of the second ink retaining member 51. By doing so, the ink retained in the second ink retaining member 51 is effectively introduced into the first ink retaining member 50, so that usability of the ink retained in the second ink retaining member 51 is improved.

In this embodiment, the ink retaining members 50, 51 comprise a laminated webs in which fibers of polyolefin thermoplastic resin material are oriented substantially unidirectionally, and the fibers are compressed in the direction of lamination (fiber aggregate), respectively.

In the ink container of this embodiment, the casing 11 and the cap member 12 made of a material which is similar to the material of the first ink retaining member 50 and the second ink retaining member 51, that is, a polyolefin resin material. Therefore, the recycling property and the reuse property are significantly improved, which is preferable from the standpoint of environmental health.

When the ink container 10B is mounted into the holder 31, the ink receiving tube 33 is abutted to the first ink retaining member 50 in the ink supply port 14, and the ink retained in the second ink retaining member 51 is directed to the ink supply port 14 by way of the first ink retaining member 50, and is supplied to the group of ejection outlets for each color from the recording head portion 32 through the ink receiving tube 33 and the ink supply passage extending to the recording head portion 32. At this time, the sealing member 39 provided around the ink supply port 14 is sealingly contacted to the bottom surface (seal surface) of the dimple portion 40 having the ink supply port 14, so that possible ink leakage and the ink evaporation can be suppressed. A free end each of the ink receiving tubes 33 is provided with a filter 34 to prevent invasion of foreign matter into the ink receiving tube.

The ink containers 10A, 10B are provided with an ordinary latch lever mechanism for securing with the holder. In this embodiment, the latch claw 18 which is one of engaging portions between the ink containers 10A, 10B and the holder 31, is provided on a latch lever 16 which upwardly extends inclined and/or curved from a portion of a side surface of the ink container adjacent the bottom portion of the ink container. The latch lever 16 elastically deforms such that latch claw 18 is engaged with the latch claw engaging hole 36 of the holder 31. The latch lever 16 has an operating portion (tag portion at the topmost portion of the latch lever) which facilitates at least a demounting manipulation of the ink container from the holder 31. In addition, the latch lever 16 elastically displaces toward the main body of the ink container when the ink container is mounted to the holder 31.

More particularly, when the ink containers 10A, 10B are mounted, the ink container 10A, 10B, as shown in Figure 5, is first inserted inclinedly adjacent the portion having the retention claw 17 toward the portion where the ink containers 10A, 10B are mounted to the holder 31, such that retention claw 17 is brought into engagement with the retention claw engaging hole 35 of the holder 31. Then, the ink containers 10A, 10B are pressed down so as to rotate

it about the retention claw 17 side, by which the latch lever 16 is elastically displaced toward the main body the ink container, and the latch claw 18 of the latch lever 16 is brought into engagement with the latch claw engaging hole 36 of the holder 31, as shown in Figure 6.

By mounting the ink containers 10A, 10B into the holder 31, the inks in the ink containers 10A, 10B are supplied through the ink receiving tubes 33 and ink supply passages in the holder 31 corresponding to the respective colors to the groups of the ink ejection outlets of the recording head portions 32, respectively.

When the ink containers 10A, 10B are to be removed from the holder 31, the operating portion of the latch lever 16 is elastically deformed toward the main body of the ink container, and the ink container 10A, 10B is taken out of the holder 31.

Further, the characteristic structure of present invention will be described in detail.

As will be understood from Figure 3, (c), in a color ink container 10B having a plurality of ink supply ports 14, the ink supply ports 14 for the respective colors, retention claws 17 and latch claws 18 are linearly arranged deviated in a direction substantially perpendicular to the direction of a line connecting the latch claw 18 and the retention claw 17

toward one side surface Q of the two side surfaces P, Q sandwiching the bottom portion of the ink container 10B. In other words, the ink supply ports 14, retention claw 17 and the latch claw 18 are all arranged substantially on a line deviated, toward one side surface Q, away from a center line of the ink container extending in the direction connecting the latch claw 18 and the retention claw 17. The ink supply port 14 are formed in a bottom surfaces of the dimple portion 40, and the standing wall portion of the dimple portion 40 is cut away at least at a side surface Q side of the ink container 10B (cut-away portion designated by reference numeral 40a in Figure 4).

With such a structure, the portion of the container bottom wall where the ink supply ports 14 are formed and therefore the strength of the casing is likely to be relatively weak, acquires high strength by positioning such a portion adjacent the corner portion (side wall connecting with the container bottom wall) where the rigid is relatively high. Additionally, since the two engaging portions where the ink container 10B and the holder 31 are engaged (retention claw 17 and latch claw 18) are deviated toward the side wall of the container similarly to the ink supply ports 14, the container is prevented from twisting upon the mounting of the container to the

holder, so that container can be stably secured with the holder by a small number of engageable portions. Particularly, even when the number of ink supply ports is large, the twisting of the ink container can be minimized effectively by the linear arrangement of the engageable portions and the ink supply ports. By the provision of the engaging portion at the position close to the side wall, the ink container positioning mechanism can be disposed at a position where the container strength is high, so that stabilized mounting can be accomplished with all the ink supply ports 14 and the ink receiving tubes 33 assuredly connected respectively. These advantages are particularly significant when the wall thickness of the entire ink container casing is reduced in order to assure a large inside volume without increasing the spaces occupied by the ink container.

In addition, after ink injection into the container casing in the manufacturing, it is necessary to wipe off the ink deposited on the surface (seal surface) around the ink supply port 14 in the dimple portion 40. In such a case, the structure in which at least one side surface Q of the dimple portion 40 is cut away and is open (cut-away portion 40a in Figure 4) is advantageous since the ink can be easily wiped off.

Generally, when the ink supply ports are

disposed deviated toward one side surface of the container, the standing wall of the dimple portion having the ink supply port formed in the bottom thereof has only a small thickness at the side to which the ink supply ports are deviated. At the thin wall molding portion, a weld line tends to appear. As a result, the ink spreads along the weld line extending from the ink supply port to the thin wall portion and will contaminate users fingers and hands. However, according to the present invention, the standing wall of the dimple portion is open at one lateral side of the ink container, that is, there is provided a cut-away portion 40a, so that there is no thin portion, and therefore, there appears no weld line. In this manner, a highly reliable ink container can be accomplished.

In this specification, "the engaging portions and the ink supply ports are arranged substantially linearly" means not only the structure in which the centers of the openings of the ink supply ports 14 are on the center line connecting the retention claw 17 and the latch claw 18 but also the structure in which the ink supply ports 14 are overlaid on the center line.

According to the embodiment, a hole for container fixing in the holder 31 may be formed at the of only two portions, namely, retention claw engaging

hole 35 and latch claw engaging hole 36. For this reason, it is not necessary to form a large hole in the holder 31, by which the deterioration of the holder strength can be avoided.

According to this embodiment, the inside of the container is divided by partition walls 52 which extend in the direction perpendicular to the direction in which the retention claw 17 and the latch claw 18 (the engaging portions for mounting the color ink container 10B to the holder 31) are arranged. This structure is defective to enhance the mechanical strength of the wall in which the ink supply ports are formed. Such a structure is preferable because the rigidity of the container in the direction in which the ink container tends to be twisted when the ink container is mounted to the holder 31.

In this embodiment, the ink mounting mechanism relative to the holder uses a latch lever. However, the present invention is not limited to the structure using the mounting mechanism employing a latch lever. For example, a lever mechanism may be provided in the holder, or another mechanism is usable, if the ink container can be effectively secured in the holder at the front and rear thereof with respect to the direction in which the ink supply ports are arranged.

In the foregoing embodiment, the ink

container comprises an ink absorbing material of fiber material. However, this is not limiting to the present invention, namely, another ink absorbing material is usable, or the ink container may not have an ink absorbing material.

The liquid retained in the ink container in the present invention is not limited to the above-described black, cyan, magenta and yellow inks, but may be another liquid which is ejected from the recording head.

(Other Embodiment)

The description will be made as to an ink jet recording apparatus using the recording head cartridge having the above-described structure.

Figure 7 is a perspective view illustrating a general arrangement of an ink jet recording apparatus carrying the recording head cartridge having the structure described in the foregoing. In the recording device shown in this Figure, a reciprocation movement (main-scanning) of the recording head cartridge 71 in the main scan direction and a feeding of the recording sheet such as a general recording paper, a special paper, OHP film or the like in the sub-scan direction at a predetermined increment, are repeated, and in synchronism with such movements, the ink is selectively ejected from the recording head cartridge 71 and is deposited on the recording sheet,

by which letters, signs, images or the like are printed on the recording sheet. Namely, the apparatus is an ordinary serial type recording device.

As shown in Figure 7, the recording head cartridge 71 with the ink container 72 for accommodating the ink for use for image formation, are carried and held on the carriage 73 which is a head holding member. The carriage 73 is guided for movement only in a direction (main scan direction) indicated by an arrow X shown in Figure 7 by a guiding shaft 74 and a guiding rail 75 which are fixed in the recording device. The carriage 73 is driven by a CR motor 76 through a carriage belt 76a to effect a reciprocal scanning motion. In this manner, the guiding shaft 74, the guiding rail75, CR motor 76, the carriage belt 76a constitutes scanning means for reciprocal scanning motion of the carriage 73.

A recording material (unshown) on which the recording is effected by the recording head portion (unshown) of the recording head cartridge 71, is nipped by a LF roller 77 and a pinch roller 78 rotatably mounted in the recording device, and the LF roller 77 is rotated by the LF motor 80 through the LF gear 79, by which as shown in Figure 7, it is fed in the direction (sub-scan direction) indicated by the arrow Y which is perpendicular to the direction indicated by the arrow X.

In the recording device, a control substrate 81 is mounted. A control circuit (control means) formed on the control substrate 81 generates control signals for controlling the recording head portion, the CR motor 76 and the LF motor 80 to control the operations of them. The recording head 71 and the control substrate 81 are electrically connected with each other by a flexible cable 82 (signal transmitting means), and therefore, the transmission of the control signal between the recording head portion and the control substrate 81 is carried out even during the scanning operation of the recording head cartridge 71 in the direction of the arrow X through the flexible cable 82.

The recording head portion is provided with a plurality of nozzle arrays corresponding to the respective colors, and the inks are ejected through the respective nozzles to effect the printing. In the recording head portion, there are provided a plurality of heat generating resistors (electrothermal transducer elements) as energy generating means for generating energy for ejection to be applied to the ink in the nozzle. A driving signal for driving the recording head portion is transmitted from the control substrate 81 to the recording head portion through the flexible cable 82, the recording head portion and the electrical connecting portion of the flexible cable

82. In response to the driving signal, the ink is ejected from the recording head portion. The method or type of the ink droplet ejection by the recording head portion is not limited to these examples.

[Advantageous Effect]

As described in the foregoing, in an ink container according to the present invention, by positioning the ink supply ports disposed on the bottom portion of the ink container adjacent the corner portion (side wall connecting with the bottom portion of the ink container) where the rigid of the casing is relatively high, the mechanical strength reduction of the ink container casing can be suppressed. This is effective to prevent deformation of the ink container upon the container mounting relative to the holder and upon the connecting of the liquid supply portions between the holder and the ink container. The two engaging portions are deviated toward the side surface of the ink container when the ink container is mounted to the holder, similarly to the ink supply ports, therefore, the ink container is prevented from twisting upon the mounting of the ink container to the holder, so that the ink container can be stably secured with the holder by a small number of engaging portions. Particularly, even when the number of the ink supply ports is large, the twisting of the ink container can be minimized effectively by the

linear arrangement of the engaging portions and the ink supply ports. By the provision of the engaging portion of the position close to the side surface of the ink container, the ink container positioning mechanism of the ink container can be disposed at a position where the container strength is high, so that stabilized mounting can be accomplished with all the ink supply ports securely connected respectively. These advantages are particularly significant when the wall thickness of the entire ink container casing is reduced in order to assure a large inside volume of the ink container.

In such an ink container, a plurality of ink supply ports can be abutted to the ink receiving portions of the holder portion, respectively, and the number of the locking portions required for the holder can be reduced since the stabilized mounting of the ink container can be accomplished by only two engaging portions. Particularly, when the engaging portion of the ink container is in the form of a projection, and the locking portion of the holder portion is in the form of an opening, the wall inside area of the holder portion is reduced. Therefore, the mechanical strength reduction of the holder portion can be prevented, and stabilized mounting of the ink container to the holder can be accomplished.

By employing the above-mentioned structure of

the present invention, the mechanical strength reduction of the ink container and the holder is prevented, and the stabilized mounting of the ink container to the holder can be accomplished. This advantage is particularly significant when the wall thickness of the entire ink container casing is reduced in order to assure a large inside volume without increasing the sides occupied by the ink container.

[Brief Description of the Invention]

Figure 1 is a perspective view of an outer appearance of an ink container and a holder portion which constitute color recording head cartridge according to an embodiment of the present invention.

Figure 2 is a top plan view of a holder shown in Figure 1.

Figure 3 illustrates a structure of an ink container shown in Figure 1, wherein (a) is a top plan view thereof, (b) is a partly broken side view thereof, and (c) is a bottom view thereof.

Figure 4 is a perspective view of a color ink container shown in Figure 1.

Figure 5 is a perspective view illustrating a state in which a black ink container and a color ink container are going to be mounted into a holder shown in Figure 1.

Figure 6 is a perspective view illustrating a

state in which a black ink container and a color ink container are going to be mounted into a holder shown in Figure 1.

Figure 7 is a perspective view of an ink jet recording apparatus with which a recording head cartridge of the embodiment of the present invention is usable.

Figure 8 is a schematic sectional view for illustrating a conventional ink container and a conventional recording head cartridge which constitutes a holder for mounting the ink container.

[Reference Numerals]

10A: ink container containing black ink

10B: ink container containing yellow, magenta and cyan inks

11: casing

12: cap member

13: rib structure

14: ink supply port

15: air vent

16: latch lever

17: retention claw

18: latch claw

30: head cartridge for color recording

31: holder

32: recording head portion

33: ink receiving tube

34: filter

35: retention claw engaging hole

36: latch claw engaging hole

38: partition plate

39: sealing member

40: dimple portion

40a: cut-away portion

50: first ink retaining member

51: second ink retaining member

52: partition plate

70: center line of an ink container

71: recording head cartridge

72: ink container

73: carriage

74: guiding shaft

75: guiding rail

76: CR motor

77: LF roller

78: pinch roller

79: LF gear

80: LF gear

81: control substrate

82: flexible cable

1: recording head cartridge

101a: air vent

101b: first engaging portion

101c: second engaging portion

102: holder

103: recording head portion

104: ink receiving tube